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Date: August 27, 2007/Jessica Sexton/

Jessica Sexton

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re patent application of:

Applicant(s): Bhanwar Singh, *et al.*

Serial No: 10/768,515

Filing Date: January 30, 2004

Examiner: John S. Ruggles

Art Unit: 1756

Title: USING SIDEWALL ABSORBER TO ENABLE THE PRINTING OF FINER  
FEATURES IN NANOPRINT LITHOGRAPHY (1XMASK)

**Mail Stop Appeal Brief-Patents**  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, VA 22313-1450**

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**REPLY BRIEF**

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Dear Sir:

Appellants' representative submits this Reply Brief in response to the Examiner's Answer dated June 27, 2007. In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [AMDP999US].

### **REMARKS**

Claims 1-8 are currently pending and are presently under consideration. Favorable reconsideration of the subject patent application is respectfully requested in view of the comments herein. In particular, the following comments address deficiencies contended in the Examiner's Answer to Appellants' Appeal Brief.

#### **I. Regarding the Rejection of Claims 1 and 3 Under 35 U.S.C. §102(b)**

The Examiner incorrectly maintains the rejection of claims 1 and 3 under 35 U.S.C. §102(b) as being anticipated by Vasudev *et al.* (WO 94/17450) or Vasudev *et al.* (US 5,411,824). This rejection should be reversed for the following reasons. Vasudev *et al.* does not disclose or suggest each and every limitation set forth in the subject claims.

A single prior art reference anticipates a patent claim only if it ***expressly or inherently describes each and every limitation set forth in the patent claim.*** *Trintec Industries, Inc. v. Top-U.S.A. Corp.*, 295 F.3d 1292, 63 USPQ2d 1597 (Fed. Cir. 2002); *See Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The ***identical invention must be shown in as complete detail as is contained in the ... claim.*** *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989) (emphasis added).

Appellants' claimed invention relates systems and methods that facilitate the reproduction of small features required for the production of integrated circuits. In particular, claim 1 recites a mask comprising: *a translucent substrate; one or more three-dimensional features comprising one or more vertical sidewalls; an absorbing material deposited upon one or more of the vertical sidewalls so that light in an incident direction to an upper surface of the substrate will be absorbed by the absorbing material, resulting in light blocking features; and one or more horizontal surfaces are formed upon one or more of the three-dimensional features that allow light rays to exit a lower surface of the substrate unobstructed by the absorbing material.* The Vasudev *et al.* references do not disclose or suggest these novel features of the invention as claimed.

The two Vasudev *et al.* documents are counterpart documents relating to the same subject matter and will again henceforth be discussed together. Vasudev *et al.* relates to a phase shifting

mask having absorbent sidewalls that reduce edge scattering and thereby improve resolution. At page 5 of the Examiner's Answers, the Examiner contends that Vasudev *et al.* teaches such novel features of Appellants' claimed invention. Appellants' representative avers to the contrary. In accordance with the subject invention, a translucent mask with three-dimensional features, where the vertical dimension comprises sidewalls, the sidewalls are coated with light absorbing material has light incident on it in the direction to the upper surface, *e.g.*, vertically, to facilitate exposure of a resist coated substrate. Light which is incident upon the light absorbing materials deposited on the sidewalls of the features on the mask will be absorbed by the light absorbing materials and light which is incident upon the horizontal surfaces, on which the light absorbing material has been removed, will pass through the mask relatively unaltered. Consequently, areas of the resist layer corresponding to locations of the vertical sidewalls of the mask will not be exposed while the balance of the resist layer will be exposed, thus enabling either the removal or the retention of small areas corresponding to the thickness of the light absorbing materials deposited on the sidewalls of the features on the mask. At the cited portions, Vasudev *et al.* discloses a phase shifting mask having trenches in a transparent or translucent substrate to form shifters, in which trenches having vertical sidewalls, the sidewalls are coated with an absorbing film, has light traversing through it. The sidewall absorbers reduce edge scattering of light by absorbing light impinging on them. However, Vasudev *et al.* is silent regarding ***light in an incident direction to an upper surface of the substrate will be absorbed by the absorbing material, resulting in light blocking features; and one or more horizontal surfaces are formed upon one or more of the three-dimensional features that allow light rays to exit a lower surface of the substrate unobstructed by the absorbing material*** as recited by the subject claim. For at least the foregoing reasons, it is readily apparent that the cited documents do not disclose or suggest every aspect of the claimed subject matter.

Moreover, for a 102 rejection, each and every feature recited in the claim must be present in the cited reference document. Additionally, an identical invention must be described by the cited document, not merely a similar or equivalent invention. Further, inherency cannot be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. The cited document needs to show that the natural result flowing from the operation as taught would result in the performance of the questioned

function. Accordingly, the rejection of independent claim 1 (and claims that depend there from) should be reversed.

**II. Regarding the Rejection of Claim 2 Under 35 U.S.C. §102(b)**

The Examiner incorrectly maintains the rejection of claim 2 under U.S.C. §102(b) as being anticipated by either of the Vasudev *et al.* documents in view of Grant *et al.* Reversal of this rejection is respectfully requested for at least the following reasons. Claim 2 depends from independent claim 1. As stated *supra*, neither of the Vasudev *et al.* references disclose nor suggest every limitation set forth in the subject independent claim. Even if Grant *et al.* could properly be relied upon as an evidentiary reference as stated in the Final Action, it does not cure the aforementioned deficiencies of the primary reference. Therefore, this rejection should be reversed.

**III. Regarding the Rejection of Claims 4 and 8 Under 35 U.S.C. §103(a)**

The rejection of claims 4 and 8 have been incorrectly maintained by the Examiner under 35 U.S.C. §103(a) as being unpatentable over either of the Vasudev *et al.* documents in view of Hashimoto (US 5,786,114). Reversal of this rejection is respectfully requested for at least the following reasons. As stated *supra*, neither of the Vasudev *et al.* documents disclose nor suggest every limitation set forth in the subject independent claim 1. Therefore, claims 4 and 8, which depend there from, are allowable for at least the same reasons. Reversal of this rejection is therefore respectfully requested.

**IV. Regarding the Rejection of Claim 5 Under 35 U.S.C. §103(a)**

The Examiner incorrectly maintains the rejection of claim 5 under U.S.C. §103(a) as being unpatentable over either of the Vasudev *et al.* documents in view of Takemura (US 5,530,265) or French *et al.* (US 2006/0051974). Reversal of this rejection is respectfully requested for at least the following reasons. Claim 5 depends from independent claim 1. As stated above, the Vasudev *et al.* documents fail to disclose or suggest every limitation set forth in the subject independent claim. Neither Takemura nor French *et al.* cure the aforementioned deficiencies of these base references. Therefore, this rejection should be reversed.

**V. Regarding the Rejection of Claim 6 Under 35 U.S.C. §103(a)**

The Examiner incorrectly maintains the rejection of claim 6 under U.S.C. §103(a) as being unpatentable over either of the Vasudev *et al.* documents in view of Aggas *et al.* (US 5,944,157) or Aggas *et al.* (US 6,020,590). Reversal of this rejection is respectfully requested for at least the following reasons. Claim 6 depends from independent claim 1, and as noted *supra*, the Vasudev *et al.* documents do not disclose or suggest every limitation set forth in the subject independent claim. Neither of the Aggas *et al.* documents make up for the deficiencies of the cited reference. For at least these reasons, this rejection should be reversed.

**VI. Regarding the Rejection of Claim 7 Under 35 U.S.C. §103(a)**

The Examiner incorrectly maintains the rejection of claim 7 under U.S.C. §103(a) as being unpatentable over either of the Vasudev *et al.* documents in view of Yeh (US 2003/0193068). Reversal of this rejection is respectfully requested for at least the following reasons. Claim 7 depends from independent claim 1. The Vasudev *et al.* documents fail to disclose or suggest every limitation set forth in the subject independent claim, as stated *supra*. Yeh fails to cure the aforementioned deficiencies; thus, this rejection should be reversed.

**VII. Conclusion**

The subject application is believed to be in condition for allowance in view of the above comments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [AMDP999US].

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact Appellants' undersigned representative at the telephone number below.

Respectfully submitted,  
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